

MONITORING GLOBAL GEOPHYSICAL FLUIDS WITH RESPECT TO LARGE-SCALE GEODYNAMIC PROPERTIES

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Since being established in January 1998 by the International Earth Rotation Service, the Special Bureaus of the Coordinating Center for Monitoring Global Geophysical Fluids (MGGF) have extended earlier activities in the effort to support and facilitate the understanding of geophysical fluids in global geodynamics research. Momentum and mass transports in the atmosphere-hydrosphere-solid Earth-core system (the "global geophysical fluids") will cause the following geodynamic effects on a broad range of time scales: (1) variations in the solid Earth's rotation (in length-of-day and polar motion/nutation) via conservation of angular momentum and effected by torques at the fluid-solid Earth interface; (2) changes in the global gravitational field according to Newton's gravitational law; and (3) motion in the center of mass of the solid Earth relative to that of the whole Earth ("geocenter") via the conservation of linear momentum. These minute signals have become observable by space geodetic techniques, primarily VLBI, SLR, GPS, and DORIS, with ever increasing precision/accuracy and temporal/spatial resolution. Each of the seven Special Bureaus within MGGF will produce calculations related to a specific Earth component or aspect -- Atmosphere, Ocean, Hydrology, Ocean Tides, Mantle, Core, and Gravity/Geocenter, and will help interpret any such forcing by these fluids. Angular momenta and torques, gravitational coefficients, and geocenter shift are computed for geophysical fluids based on global observational data, and from state-of-the-art models, some of which assimilate such data. The computed quantities, algorithm and data formats are standardized. The results are archived and made available to the scientific research community. This paper reports the status of the MGGF activities and current results.